VALUABLE IDEAS *for* Auto Workers

OF THE common mistakes most motorists make, leaving the car with the ignition switch turned on and attempting to start with the emergency brake set head the list. Ideas to warn against these lapses of memory have appeared on this page before. Here is a single indicator light that serves both purposes. Note the arrangement in Fig. 1.

Any kind of colored glass indicator light is fitted to the dash. If the latter is of metal, the light should be insulated so that neither terminal is grounded. One terminal is connected to the wire that supplies current to the ignition circuit. The other terminal should be attached to the single contact of the grounded type of stop-light switch.

Fasten the latter at some convenient point to the metal framework under the floor boards in such a position that a piece of strong wire or chain can be attached to the emergency brake linkage. Adjust it so that the switch is closed when the brake is on.

When the car is standing with the brake set and the ignition switch off, the light will be out. When you turn on the ignition switch, the light will glow and will then go out again when you release the emergency brake. As it is quite unlikely that you will leave the car with the ignition on and the brake off, the single light will enforce the correct use of both.

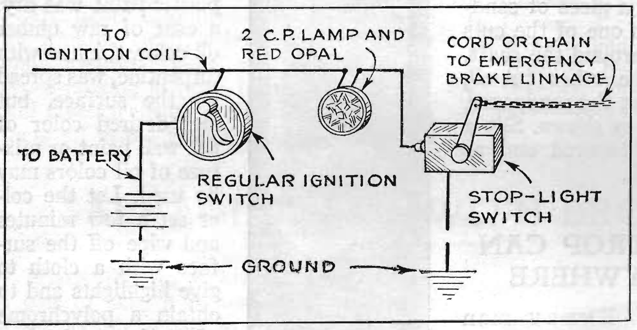


Fig. 1. Red light installed on the dashboard will warn driver against trying to start car with brake set or leaving it with switch on

A jewel light can be obtained from a radio store, or use the red glass jewel from an indicating type of wall switch.

Rear Seat Foot Rest

FIGURE 2 shows a simple type of foot rest that will protect the upholstery on the "short-coupled" type of coach. Strap iron brackets, shaped as shown, are attached to the underside of the front seats. The crossbar should be made of tough, hard wood. Grooves as deep as the thickness of the strap iron give the job a finished appearance, but a straight rod of wood or a section of iron pipe capped at both ends could be used.

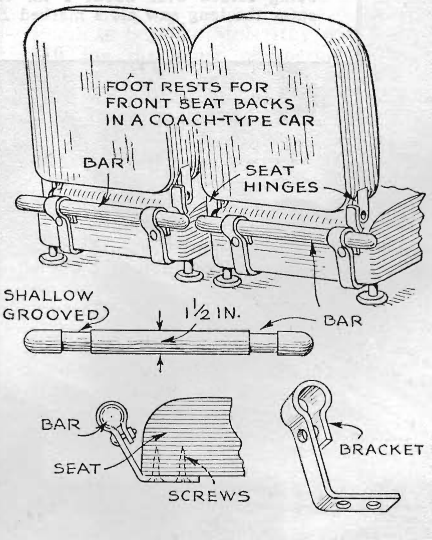


Fig. 2. Strap iron brackets, fastened to front seats in a coach, hold crossbar for foot rest

To Remove Carbon

THE usual method of cleaning the hard carbon deposit from the valve stems is by scraping after the valves have been removed. Figure 3 shows a way to do the job without removing the valves at all. A piece of clock spring should be bent as shown, with the edge curved on one end and the other fitted to any convenient type of handle.

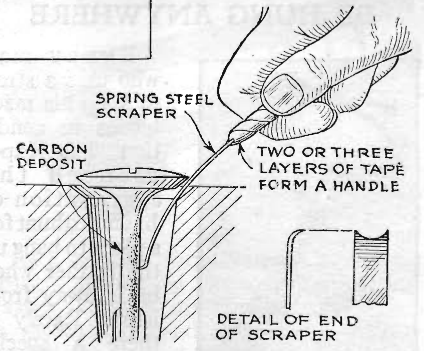


Fig. 3. A piece of bent clock spring can be used to remove carbon with valves in place

WIN A $10 PRIZE

Each month we award $10 for the best idea sent in for motorists. This month's prize goes to L. A. Griggs, Nanaimo, B. C. (Fig. 1). Contributions are requested from auto mechanics and if published will be paid for.

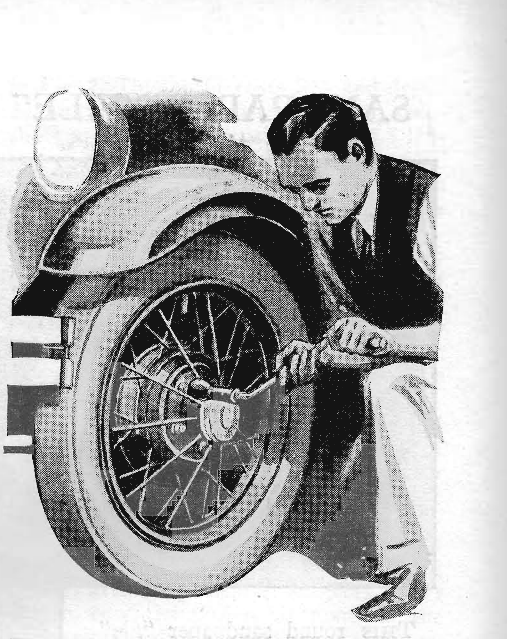


Fig. 4. Tire wrench won't knock enamel off wire wheels if a piece of rubber is wound around it

After the carbon has been scraped from the cylinder head and the tops of the pistons in the usual way, turn the motor over so that No. 1 exhaust valve is open, then scrape the valve stem as shown and repeat for the other cylinders. The inlet valves need not be scraped as carbon rarely forms on them.

Protect Wire Wheels

WIRE wheels are strong, light, and good looking, but they are a nuisance to clean. It is still harder to keep them looking well if the enamel is chipped off. Many cars are fitted with wire wheels fastened to the hubs by means of six or more bolts.

In changing tires, the steel wrench is sure to knock off some of the enamel unless the end of the wrench is covered with rubber. A section of inner tube wrapped around the end of the wrench, and held in place with rubber bands cut from the same scrap tube, will save the spoke enamel as shown in Fig. 4.

Flashlight Holder

A GOOD flashlight should be part of the equipment of every motorist. However, the common practice of tossing the flashlight into the tool kit usually results in a flashlight that is out of commission just when you need it most. Figure 5 shows a convenient way to mount the flashlight on the steering column, where it is handy and yet out of the way.

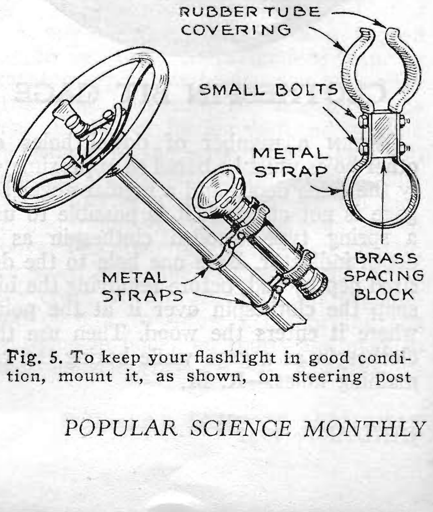


Fig. 5. To keep your flashlight in good condition, mount it, as shown, on steering post

New Ideas TO AID ALL WHO WORK ON CARS

IN COLD weather, the wooden rim of a steering wheel may get so cold it will chill the hands when first grasped. Modern steering wheels, however, are rimmed with a molded composition that is a far better conductor of heat than is wood. Chilly fingers caused by modern steering wheels can be prevented by wrapping the wheel rim with a layer of wool as shown in Fig. 1. Wool Army puttees are suitable for the purpose. The winding must be tight and the ends of the puttees should be cemented firmly to the wheel.

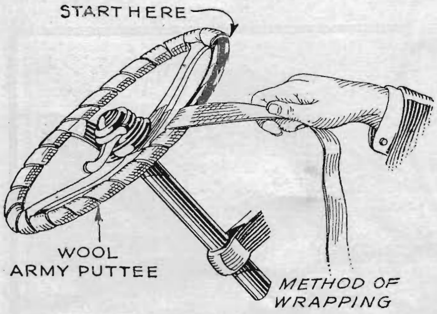


Fig. 1. Wrapping the steering wheel with wool protects the fingers from its chilling rim

Missing at High Speed

AS A CAR gets older, joints in the frame and motor mounting loosen and this often causes queer troubles with the ignition system. A motor may, for example, hit evenly on all cylinders at low speeds but develop a bad miss at high speed. Often this miss can be eliminated by connecting a wire from the metallic part of the ignition head to the nearest point on the frame, as shown in Fig. 2. Sometimes, however, it is more effective to run a flexible wire from a convenient bolt on the crank case to the frame of the motor.

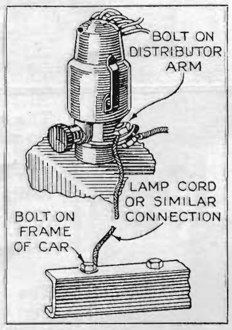


Fig. 2. Wire from ignition head to car frame stops motor's missing

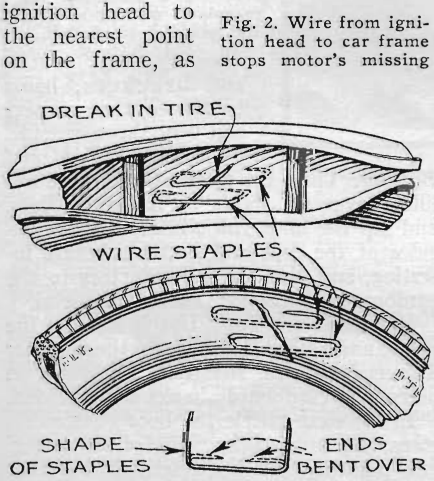


Fig. 3. Holes cut by bottles in good tires can be mended by stapling the cut edges together

A Cut Tire

OCCASIONALLY a tire is badly cut by a broken bottle or piece of metal long before the casing is worn out. Figure 3 shows a way to hold the cut together and prevent undue wear on the blowout shoe. Use wire staples as indicated to draw the edges of the cut together. The ends of the staples should be clamped tightly against the outside surface of the shoe. Even if they are in such position that they become worn away, the air pressure will still hold the staples in place. Sketch in lower left-hand corner of page shows the idea.

New Tire Tool

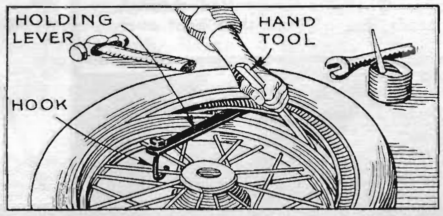


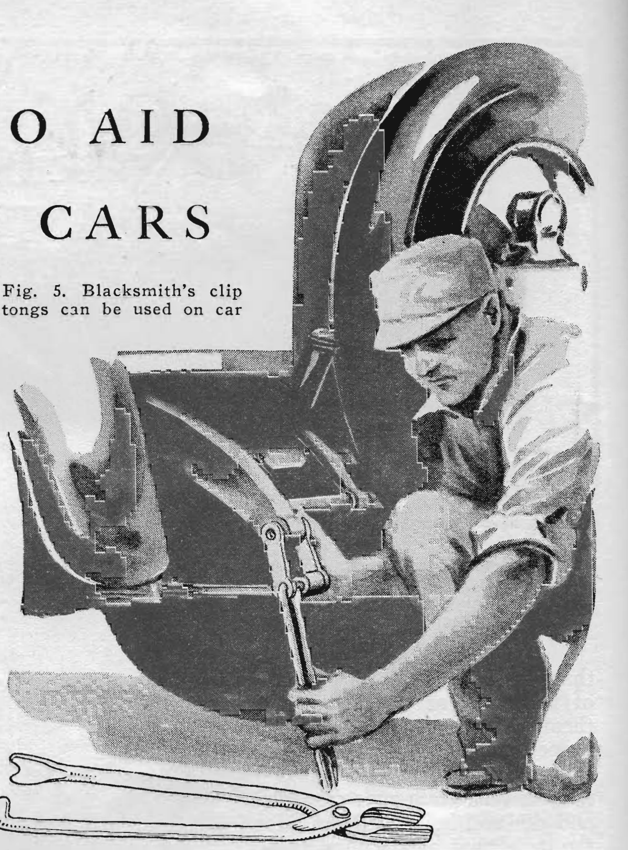
Fig. 4. A hook on a short iron catches spoke and helps in getting tire off sticking rim

IN THEORY, it is an easy job to remove a tire from a rim, but often the tire is stiff and hard to spring. Figure 4 shows a tool that will help. An extra short iron is fitted at the hand end with a hook-shaped bolt passed through a hole and held loosely in place with a nut, the end of the bolt being riveted over. The tire is first started with a regular iron and then held as shown with the special tool while an additional section is jacked off.

A Clip Tong

THE modern auto mechanic can take a tip from the old-time blacksmith. The blacksmith's clip tong, shown in use in Fig. 5, is one example. The handle ends of ordinary tongs are altered by cutting one a half inch shorter, flattening a trifle, and forming the end to a shallow crotch shape. The other handle end is given a short right-angle bend. The drawing shows how the clip tong is used to pull into line a shackle clip. A powerful pull can be exerted with little effort by means of this tool.

Fig. 5. Blacksmith's clip tongs can be used on car



WIN A $10 PRIZE

Each month we award $10 for the best idea sent in for motorists. This month's prize goes to Edward E. Leinen, Rochester, N. Y. (Fig. 6). Contributions are requested from auto mechanics and if published will be paid for.

Your Back Curtain

INSTEAD of the sloppy appearance of a rolled back curtain, the arrangement shown in Fig. 6 provides a neat way to support the curtain flat against the underside of the top. It also provides a place to store robe, blanket, or heavy coat when the back curtain is down.

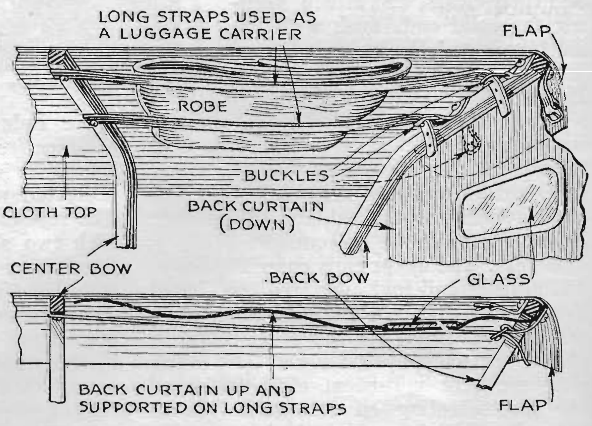

LONG STRAPS USED AS A LUGGAGE CARRIER
FLAP
ROBE
BUCKLES
CLOTH TOP
BACK CURTAIN (DOWN)
CENTER BOW
BACK BOW
GLASS
BACK CURTAIN UP AND SUPPORTED ON LONG STRAPS
FLAP

Fig. 6. Drawing shows how back curtain can be supported flat against car's top and rack also used to carry a robe

Short Cuts for Car Workers

WIN A $10 PRIZE

Each month we award $10 for the best idea sent in for motorists. This month's prize goes to C. F. Blake, Oregon City, Ore. (Fig. 6). Contributions are requested from auto mechanics, both amateur and professional, and if published will be paid for.

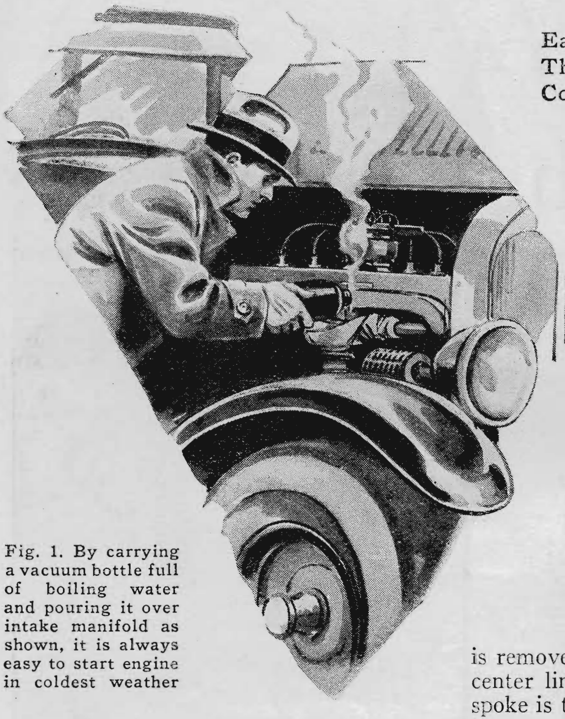


Fig. 1. By carrying a vacuum bottle full of boiling water and pouring it over intake manifold as shown, it is always easy to start engine in coldest weather

ONE of the best known ways of starting a motor car in extremely cold weather is to pour boiling hot water over the intake manifold. Of course care has to be taken to see that the water does not get into the air intake openings of the carburetor. The only difficulty is that when you need the hot water most, your car may be far from a source of supply. An ingenious way out of this difficulty is to place a large vacuum bottle filled with boiling water in the car before you start out. Then, no matter how many hours your car has been standing or how cold the weather is, when you want to start for home the contents of the vacuum bottle poured over the manifold will assure a quick start.

Stop Air Draft

MANY types of car heaters consist of a sheet metal jacket over the exhaust manifold or over a portion of the exhaust pipe with arrangements so that air is forced over the heated surface and then into the car. Sometimes the flow of air is so fast that it does not pick up much heat and the resulting draft in the car is unpleasant. One way to slow down the flow of air and increase its heat is to stuff mineral wool into the jacket as shown in Fig. 2. The amount of material and the tightness of the packing will, of course, have to be determined experimentally.

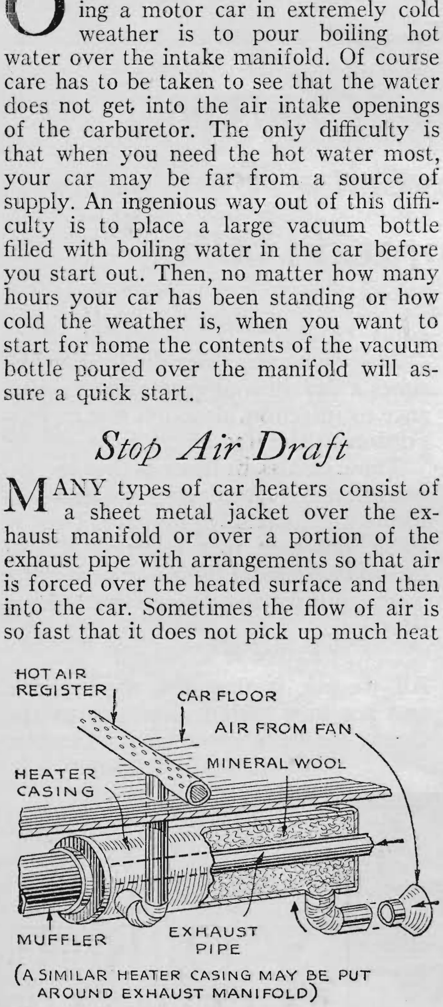


Fig. 2. Mineral wool stuffed into the jacket over exhaust manifold will stop a cold draft

To Repair a Spoke

FIG. 3 shows a way to repair a broken spoke in a welded wire wheel when the break is close to the rim. The first job is to chisel off the stub of the spoke remaining on the rim. Then the hub cap is removed and a 15/32-in. hole drilled in center line of the spoke. The end of the spoke is threaded with 1/4 by 20 die. After that, a 7/16 by 1 1/4 inch cap screw is drilled lengthwise and tapped with a thread to fit the end of the spoke. The bolt is screwed on tight. The job is finished by soldering around the bolt and filing to the contour of the others. After painting, the repaired spoke was not noticeable. Soldering is not absolutely necessary, but it hides the repaired spoke and prevents loosening by vibration.

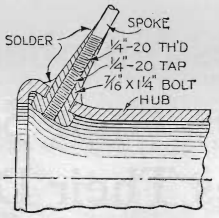


Fig. 3. This diagram shows how a wire spoke, broken close to rim, can be mended so as to be unnoticeable

Lock in Plain Sight

TO BE effective, an auto lock must either be so strong that it cannot easily be forced, so carefully concealed that the thief cannot locate it, or so obvious that he is sure to overlook it. Fig. 6 shows an excellent lock of the third class. A double contact socket is mounted in a prominent place on the dash. The wire supplying the ignition circuit is cut and the two ends attached to the socket. Then a double contact plug is short-circuited with a short piece of wire. When you want to run the car, insert the plug in the socket. Remove the plug when you leave and a thief attempting to steal the car is sure to think that the socket has no other function than to permit the use of a trouble light.

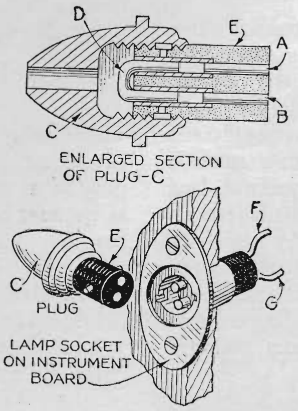


Fig. 6. Here is an auto lock so easily seen a car thief will think it is merely a socket

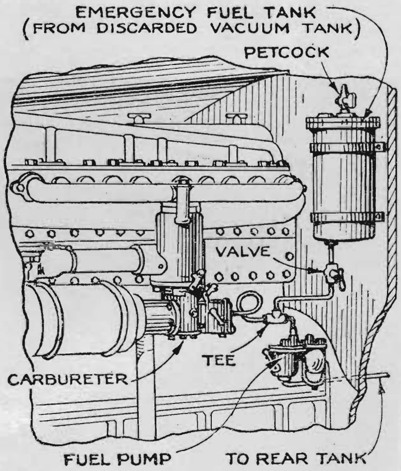


Fig. 4. A tank on the dash can be connected with fuel pump as emergency gas supply

An Emergency Tank

FEW car owners realize that the characteristics of the fuel pump on the modern auto are such that the fitting of an emergency gasoline tank is easy. All the equipment you need is a discarded vacuum tank. Remove the "insides" from the vacuum tank and mount it on the dash at any convenient point as shown in Fig. 4. Plug all holes in top but one; fit a petcock to that one. Put a tee in the fuel line between the carburetor and the fuel pump and connect it, by way of a shut off valve, to the vacuum tank. To fill the spare fuel tank, open both the valve and the petcock while the motor is running.

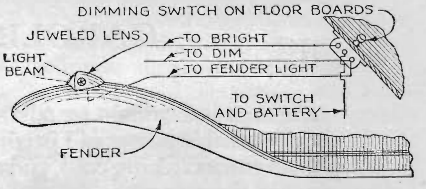


Fig. 5. Bulbs on the fender can be used to show whether bright or dim lights are on

Light Indicator

IT IS often difficult to tell, on brightly lighted streets, whether the bright or dim headlights are on. Fig. 5 shows a way to fit an indicator that will tell this. Clearance lights are mounted on the fenders and connected in parallel with the filaments that project deflected beams. When these lights are on dims are on.

New Ideas of Value to Car Workers

EVEN in these days of broad concrete highways, there still remains a vast mileage of dirt roads where it is easy to get stuck in a mud hole. Fig. 1 shows a simple way to get out of any mud hole, no matter how deep. Take a piece of two-by-four about two feet long and chain it to the front side of the tire in such a position that it will lie squarely across the rut. Start the car slowly and the wheel will ride up over the two-by-four. Then jam on the brake to prevent the wood from being carried up against the mud guard. It may be necessary, if the wheel is badly mired, to repeat the process. If you contemplate a trip during which you are likely to encounter muddy going, be sure to carry a piece of chain and a length of two-by-four in the tool kit.

WIN A $10 PRIZE

Each month we award $10 for the best idea sent in for motorists. This month's prize goes to Wesley Kuhlmann, Woodcliff, N. J. (Fig. 3.) Contributions are requested from auto mechanics, both amateur and professional, and if published will be paid for.

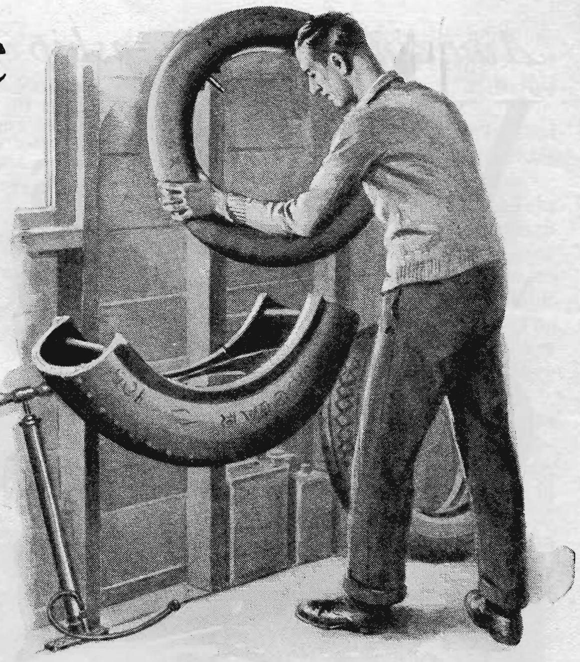


Fig. 4. Section cut from a large truck tire can be used as water container in which to test inner tubes for leaks

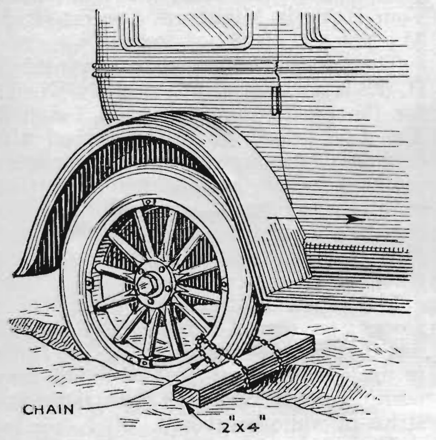


Fig. 1. A piece of two-by-four, chained to wheel, can be used in getting out of mud

Water Supply Tank

FOR week-end picnics, camping trips, and long tours through arid regions, a convenient water supply can be arranged by fitting a special tank to the running board. Procure a suitably shaped gasoline tank from an auto junk yard. Clean thoroughly with washing soda. Plug or patch unused openings and fit the tank with brackets and key type outlet as shown in Fig. 3. The advantage of the latter is that it requires pliers to draw water so children cannot easily open it. Being attached with only two bolts, it can be removed in a minute or two when not wanted.

Repairing Muffler

A SIMPLE, quick and lasting repair can be made to a muffler that has been blown out by a back-fire. Cut a strip of sheet asbestos several inches wider than the hole and long enough to go twice around. Cut a strip of galvanized sheet iron as wide as the asbestos and one and one half inches longer than the circumference of the muffler. Make a right angle bend at each end to form a bolt flange. Wrap the asbestos tightly around the muffler, center the hole, and bolt it in place with the galvanized iron band. This method of repair is of no value on a muffler that has rusted through.

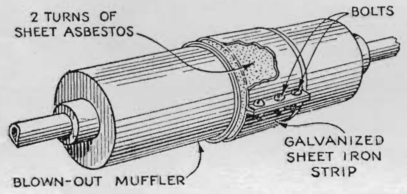


Fig. 2. Sheets of asbestos and galvanized iron give a lasting patch for blown-out muffler

Test for Leaks

THE simplest way to test a tube for leaks is to place it under water and watch for bubbles. However, the usual round tin tub or wooden wash tub takes up a lot of room. An excellent water container for this purpose is a section of a large truck tire attached to the wall as shown in Fig. 4. It takes up little space and its shape matches that of the partly inflated tube. Wooden struts should be used to spread the beads to the proper width. A suitable section of a blown-out truck tire can be obtained at little expense from the nearest auto junk yard.

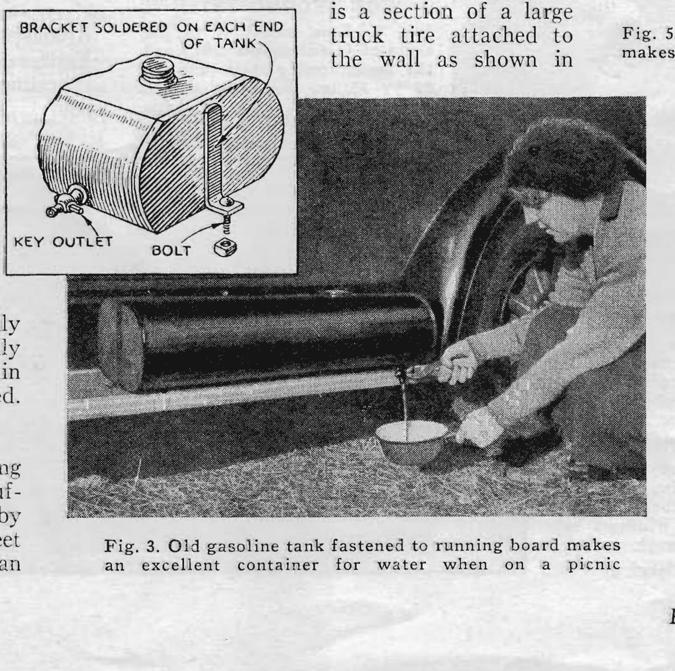

BRACKET SOLDERED ON EACH END OF TANK
KEY OUTLET
BOLT

Fig. 3. Old gasoline tank fastened to running board makes an excellent container for water when on a picnic

To Hold Up Hood

WITH many types of cars, it is impossible to raise both sides of the hood at once whenever there is any repair work to be done. However, it is possible to get the desired result by the use of a forked board as shown in Fig. 5. An ordinary clothespin could be used, of course, but the weight of the hood might split it, allowing the sides to crash down. Note that the forked board should be reinforced with a cross bolt to eliminate this danger. If the car has an extra long hood it is desirable to make two forks so that one can be used to hold the hood sections together at each end. Do not attempt to make these forks out of light soft wood as they will not be strong enough for the purpose, but use well seasoned hardwood.

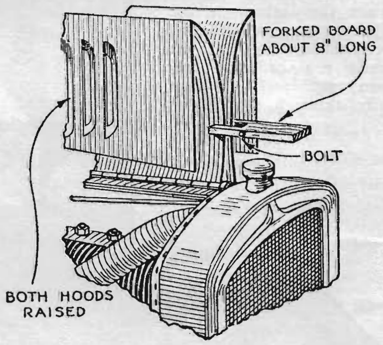


Fig. 5. Forked board, used as in the drawing, makes it possible to raise both sides of hood

Help *for* Car Workers

Practical Hints for Owner and Machinist

HERE is a way to make a water level indicator for your radiator. First solder a valve nut to the center of the radiator cap. Then drill a hole through center of radiator cap to take a brass machine screw. Drill a 3/32-inch hole lengthwise through the machine screw. To the top of vertical wire fasten a small piece of dowel rod colored red. File away one side of a valve cap and fit a piece of glass. Fit the cork at the lower end of the wire so it will support the indicator near the top of the valve cap when the radiator is full.

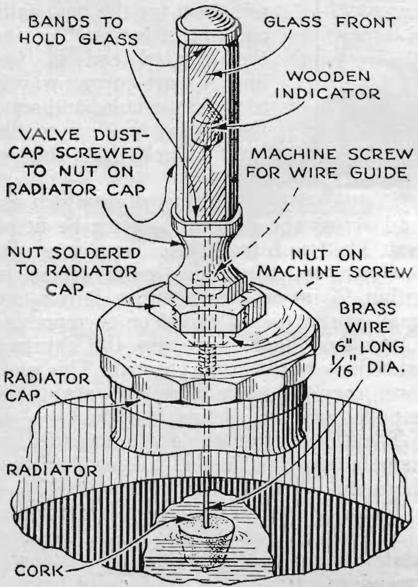

BANDS TO HOLD GLASS
GLASS FRONT
WOODEN INDICATOR
VALVE DUST-CAP SCREWED TO NUT ON RADIATOR CAP
MACHINE SCREW FOR WIRE GUIDE
NUT SOLDERED TO RADIATOR CAP
NUT ON MACHINE SCREW
BRASS WIRE 6" LONG 1/16" DIA.
RADIATOR CAP
RADIATOR
CORK

Fig. 1. Indicator of old parts can be assembled as shown to register water in radiator

Save the Gasoline

ON SOME cars, the gasoline tank is filled through a piped opening and air pressure may back up in the tank and spray gasoline out. A cure for this trouble is shown in Fig. 2. Take a two-foot length of quarter-inch copper pipe and bend it into a curve. Push it into the filler hole so that the inner end curves up. Wedge it in place with the nozzle of the hose. The copper pipe provides an unimpeded passage for the outflowing air.

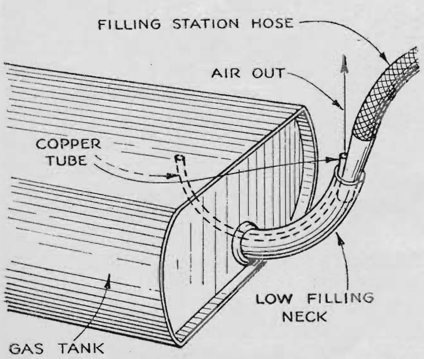


Fig. 2. Copper pipe, curved inside gasoline tank's filling pipe, keeps gas from escaping

WIN A $10 PRIZE

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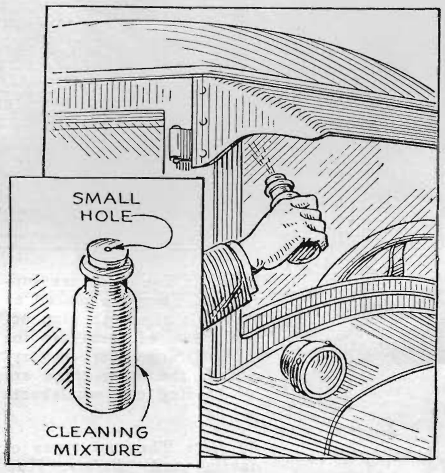


Fig. 3. Soapy water, containing a little vinegar, is squirted on the windshield to clean it

To Clean Windshield

SOAP and water usually will clean the windshield, but it is difficult to do the job without spilling soapy water on the body. Figure 3 shows a solution of this trouble. Fill a bottle with soapy water containing a small amount of vinegar. Fit the bottle with a cork grooved on one side or with a small hole burned through the center with a red-hot wire. Whenever the windshield needs cleaning, dash a few drops of this mixture on the glass and polish with a clean dry cloth.

Emergency Fan Belt

IT OFTEN is possible to drive a car for miles after the fan belt breaks without causing the radiator to boil if the going is level. In mountainous country in hot weather, the fan is necessary. If the belt goes to pieces, try cutting a fairly broad section from an old inner tube and spring it around the pulleys. This will drive the fan till you can get to a service station and install a new one.

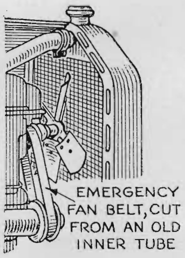

EMERGENCY FAN BELT, CUT FROM AN OLD INNER TUBE

Fig. 4. Section cut out of inner tube can be used in place of a worn fan belt

Skid Chain Cleaner

HANDLING chains is a dirty job at best. Figure 5 shows a way to clean chains without even getting your hands wet. Take two pails, one large, one small, and perforate the smaller with a number of holes in side and bottom. Put the dirty chains in the small pail and fill the large pail with water. Dip the small pail into the large one several times and all the mud will be washed off the chains into the lower pail. In case the chains are covered with road tar or road oil, fill the large pail with kerosene and allow the smaller pail containing the chains to stand in the kerosene overnight. This treatment will in most instances free the chains of all oil and tar.

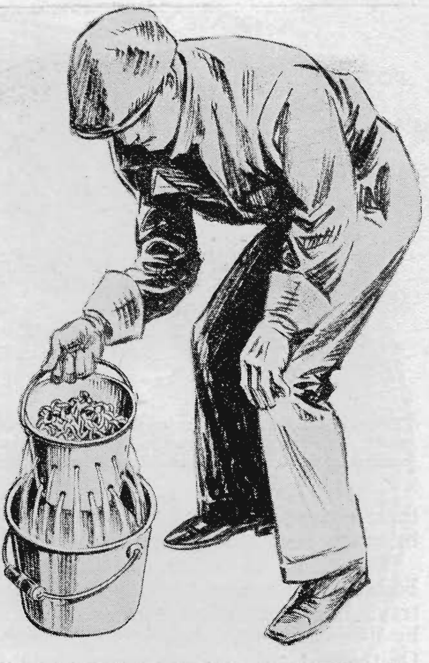


Fig. 5. Big pail and perforated small pail make handy apparatus for washing mud from chains

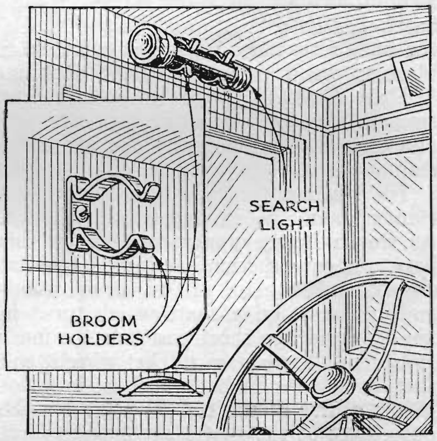


Fig. 6. Flashlight is held in a convenient position by broom holders fastened above the door

Flashlight Holder

IT IS good practice to carry a flashlight in the car at all times, but tossing it into the tool box with the rest of the tools is one way to ruin it. The jouncing tools will bang it to uselessness in short order. Figure 6 shows a good way to carry the flashlight. Fit two broom holders over the door, or at some other convenient point in the upper part of the body. Being out of the usual line of vision, a flashlight in this position is not likely to be stolen. Be sure it fits snugly, so vibration will not dislodge it.

SHORT CUTS
That Aid All Car Workers

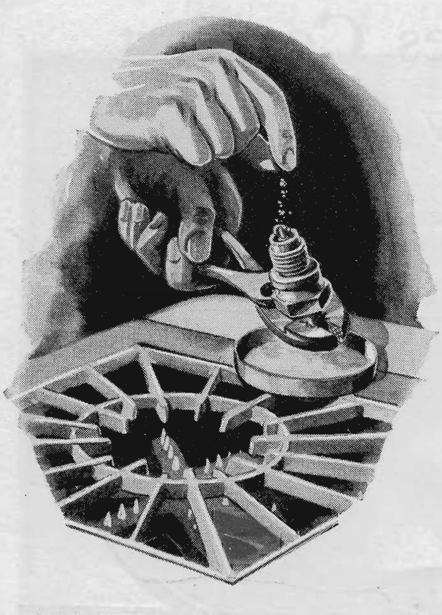


Fig. 1. Potassium chlorate crystals, clinging to spark plug, remove carbon when plug is heated

WIN A $10 PRIZE

Each month we award $10 for the best idea sent in for motorists. This month's prize goes to Addison Shiek, Oakland, Calif. (Fig. 1). Contributions are requested from auto mechanics, and if printed will be paid for at usual rates.

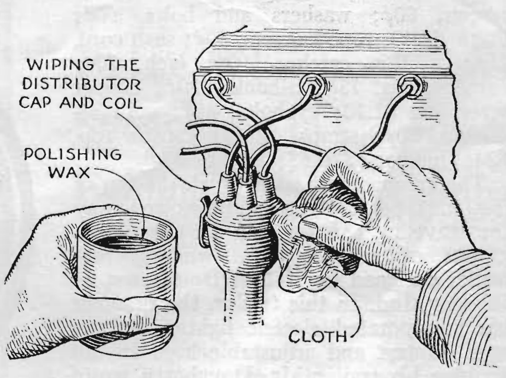

WIPING THE DISTRIBUTOR CAP AND COIL
POLISHING WAX
CLOTH

Fig. 4. Keep the distributor head clean and rain can't form a short-circuiting film there

SCRAPING the carbon from the shell that surrounds the center electrode of a spark plug is difficult. However, it can be removed easily with a small quantity of potassium chlorate crystals. Get an ounce or two of this chemical from the drug store, then heat the plug over the gas stove (firing side down) till potassium chlorate, sprinkled over the electrodes and insulator, melts and sticks. Heat again until there is a distinct puff caused by the sudden oxidization of all the carbon by the oxygen from the chlorate. The latter is reduced to potassium chloride, which can be dissolved in plain water. After heating to dry out the moisture, the plug will be ready for service. The heat developed by the sudden combustion of the carbon will not harm the plug.

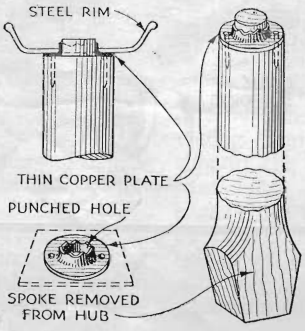


Fig. 2. Loose spokes in wood wheels can be tightened with sheet copper as diagram shows

To Tighten Spokes

AFTER years of service, especially in dry climates, the wood spokes of auto wheels become loose and cause creaking noises. Figure 2 shows a way to tighten them. Dismount the wheel by removing the flanges, then cut and punch soft sheet copper, as shown, to form washers which will fit over the ends of the spokes. This arrangement takes up both the looseness between the shoulder of the spoke and the steel rim and also that of the stud in the hole.

Stopping a Rattle

WHEN the leather hood lacing, which prevents metal to metal contact between the radiator shell and the edge on the cowl against the hood, becomes worn, rattles develop. A quick cure, if new lacing is not available, is shown in Fig. 3. Cut flat washers from a rubber cork such as used with household ammonia bottles. Countersink them with a drill or penknife and fasten at intervals with a split rivet or paper fastener.

Leaking Current

RAIN water puts the auto ignition system out of commission by forming a film of moisture over the distributor head and thus causing current leakage from the high tension spark plug wires. This trouble is most likely to occur if the distributor head is coated with a film of grime. If the distributor and the wires leading to it are given an occasional thorough polishing with any good auto body wax, rain will roll off, not form a short-circuiting film.

Support for Head

WORKING beneath the car gives most men a pain in the neck. Figure 5 shows a form of rest that fastens to the head so it is always in place no matter how much you move about under the car. It is a sure cure for this particular form of pain in the neck. The rest should be bent to shape from heavy wire and a canvas or khaki pad fitted across the top. An elastic band cut from a large inner tube serves to hold it in place or if no tube is available, a canvas or leather strap can be attached by means of short pieces of inner tube to provide the necessary tension.

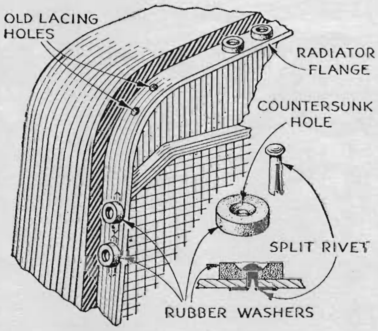


Fig. 3. Washers cut from a rubber cork can be used to prevent the rattle caused by the radiator shell striking the hood

Warns Against Thief

ANOTHER variation of the auto horn thief warning idea is shown in Fig. 6. Instead of hooking the horn circuit so that it blows when the ignition switch is turned on, this arrangement blows the horn when the intruder sits in the driver's seat, and continues to blow until he gets out of the car. The secret switch under the dash puts the circuit out of use while the owner is using the car.

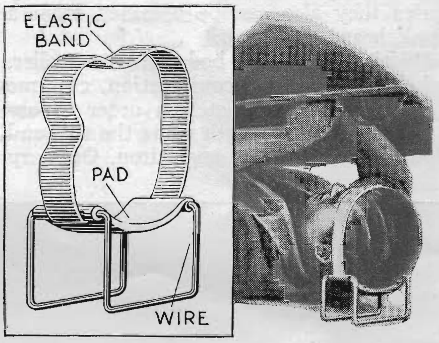


Fig. 5. Head rest, formed of heavy wire and elastic band, helps when working beneath car

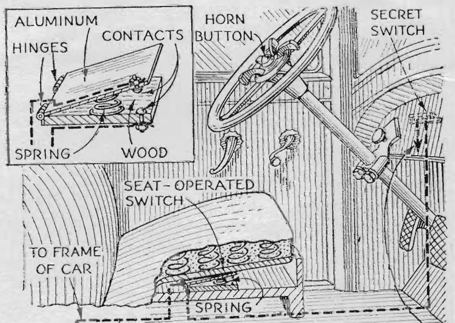


Fig. 6. Secret switch under driver's seat starts horn blowing when thief tries to steal your car

USEFUL SUGGESTIONS *for* Auto Workers

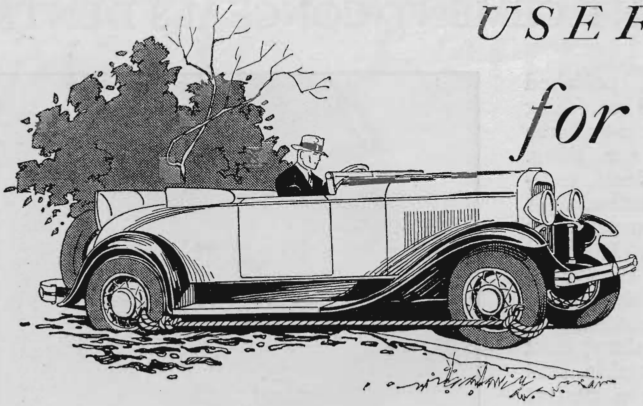


Fig. 1. By tying a rope from the rear wheel to the front one, a kind of four-wheel traction is possible to help a car out of mud when rear wheels sink in

A MUDDY road would have to be unusually bad to stall a motor car if it had four-wheel drive. You can take advantage of this fact the next time you get stuck. Figure 1 shows a way to obtain traction with all four wheels. Tie a rope to the front side of the rear wheel in line with the bottom of the running board. Fasten the other end of the rope to the front wheel at approximately the same point. Then if you let in the clutch with care, the front wheel will be pulled around for about a third of a revolution and the car will be pulled forward that far. If both of the rear wheels are mired, both front wheels can be roped in this manner. Of course, care must be used with this method, as the automobile can only be driven a couple of feet with one tying of the ropes.

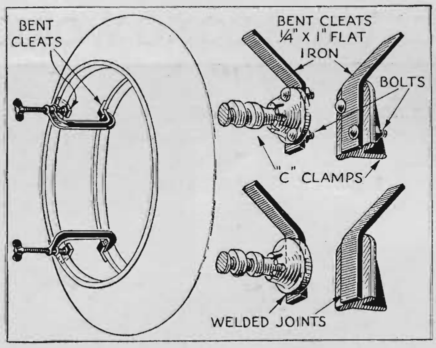


Fig. 2. Tire spreaders that are handy for heavy work are made of strap iron welded to C clamps

Tire Spreaders

FIGURE 2 shows a way to make tire spreaders that are helpful if you have much work to do on heavy tires. Obtain a couple of C clamps with an opening equal to the distance you want to spread the tire. Bend cleats out of strap iron as indicated and weld to the jaws of the C clamps or attach them by drilling 11/64-inch holes and tapping with 3/16 USS tap. Bolt the cleats in place with 3/16-inch stove bolts. The bent cleat attached to the fixed jaw of the clamp will always remain in the right position. Spreaders of this type are particularly useful on truck tires.

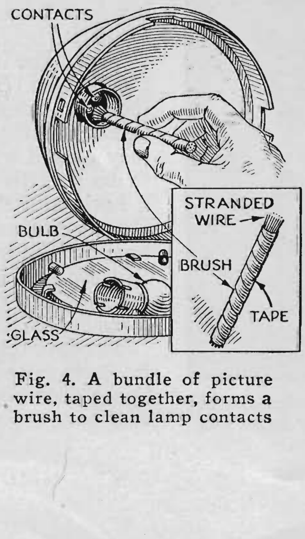


Fig. 4. A bundle of picture wire, taped together, forms a brush to clean lamp contacts

WIN A $10 PRIZE

Each month we award $10 for the best idea sent in for motorists. This month's prize goes to B. Elkin, Woodside, Long Island, N. Y. (Fig. 3). Contributions are requested from auto mechanics, and if printed will be paid for at usual rates.

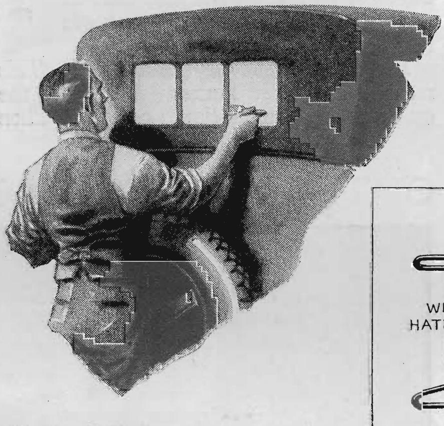


Fig. 3. Collodion, acetone, and alcohol mixed will clean celluloid

To Clean Celluloid

IN A year or two the celluloid windows in the curtain of an open car become fogged and scratched so that it is difficult to see through them. The usual remedy is to have new celluloid lights fitted, but it is often possible to restore a clear surface by treating with a preparation of one ounce of flexible collodion, one ounce of acetone, and two ounces of alcohol.

A Wire Brush

CLEANING contacts in lamp sockets is difficult. A tool that does the work easily is shown in Fig. 4. To make it, take several pieces of stiff picture wire and lay them side by side in a bundle. Tape tightly, leaving about 3/16 of an inch of wire exposed at one end.

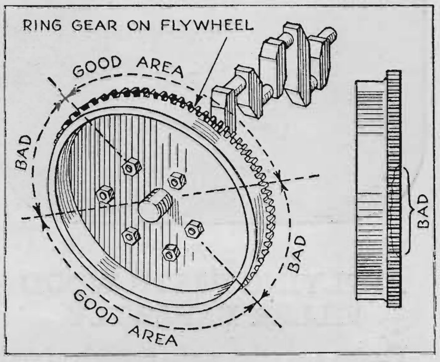


Fig. 5. This diagram shows how teeth wear on flywheel. Changing its position as shown brings unworn portion of its teeth into use

To Save a Flywheel

ON A four-cylinder motor, the effect of the compression is such that the motor almost invariably stops with the pistons about mid-point in their strokes. The result is that the teeth on two restricted portions of the flywheel gear take all the wear of the engaging starting pinion. In time, the teeth at these points become chewed away and the starter jams. The diagram in Fig. 5 shows how this works out. Note that plenty of good teeth are left on the flywheel. It is possible to remove the flywheel and bolt it in a new position sixty or 120 degrees from its previous location. This gives good teeth with which the starter pinion can engage, the worn teeth coming into action only after the pinion is all the way in. This operation will give you what practically amounts to a new flywheel.

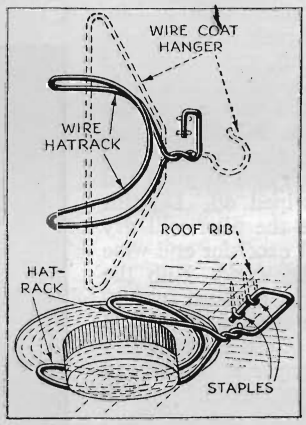


Fig. 6. Bend arms of coat hanger inward; staple to rib in top. This is a good hatrack

Simple Hatrack

MANY motorists find it more comfortable to drive in hot weather with their hats removed. This brings up the problem of what to do with the hat when the car holds a full complement of passengers. Figure 6 shows a simple hatrack that can be made out of the ordinary wire type of coat hanger. The straight cross wire is curved inward and the ends brought out to form a half circle. With the hoop bent as shown, a couple of staples will hold the hatrack securely to a rib in the top of the car. If it is more convenient, fasten the holder to the side of the car with the hoop pointing upward.

New Ideas *for* Car Workers

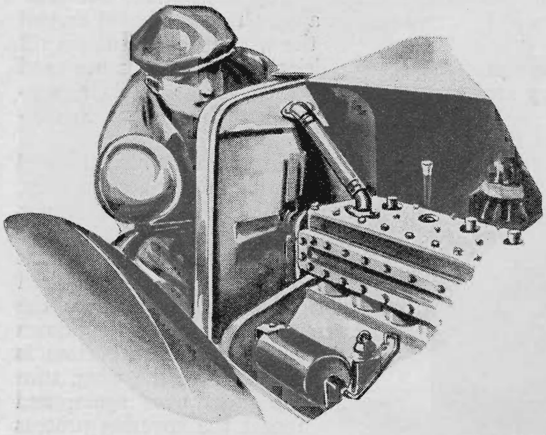


Fig. 1. To get motor's firing order put corks in place of spark plugs and turn the engine over by hand

THERE are several ways to find the firing order of the cylinders of an automobile engine when this information is not marked on the motor. One is to watch the motion of the valves while an assistant slowly cranks the motor. A simple and quick way is to remove the spark plugs and put corks in their places. Turn the motor over slowly by hand and the corks will pop out of the spark plug holes one by one in the firing order.

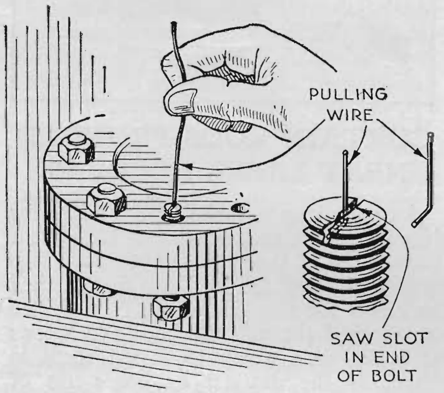


Fig. 2. To pull bolts into cramped quarters, set wire in slot in bolt and thread through hole

Pull Bolts into Place

A WIRE can be used to pull bolts into cramped quarters if you follow these directions: Make a slot in the end of the bolt with a hack saw slightly deeper than the diameter of the wire you intend to use. Place the end of the wire in the slot and peen the edges over the wire. Bend the wire at right angles so that it is parallel with the axis of the bolt. Thread the wire through the hole, pull the bolt after it, and slip the nut over the wire so that it can be started on the threads. Wire can then be pulled free and a screw driver used to hold the bolt while the nut is being tightened. In some cases the wire must be inserted before attaching bolt.

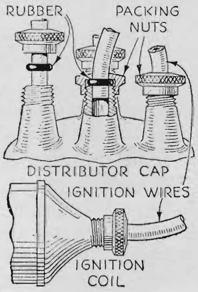


Fig. 3. Short circuits prevented with rubber under packing nuts

Short Circuits

ASSUMING that the ignition cables are in good condition, the points where water can cause a short circuit are around the ends of the wires at the distributor cap and across the spark plug insulators. Figure 3 shows a way to make the distributor cap ends of the high tension wires absolutely waterproof. Thread the ends of the sockets on the cap and fit brass packing nuts with rubber packing rings as shown. For a complete job, the terminal of the ignition coil should be treated in the same manner and all the spark plugs should be equipped with waterproof jackets such as are sold for installation in marine engines.

WIN A $10 PRIZE

Each month we award $10 for the best idea sent in for motorists. This month's prize goes to M. L. Abele, Honolulu, Hawaii (Fig. 4). Contributions are requested from auto mechanics, and if printed will be paid for at usual rates.

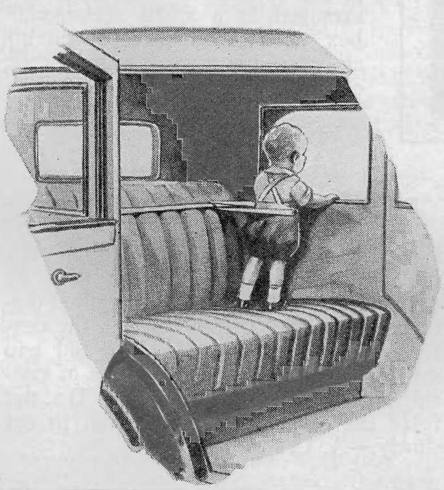


Fig. 4. A fabric strap across the back seat with a loop around baby keeps little traveler safe

Traveling with Baby

TRAVELING with a baby aged six months to two years is a nerve-wracking and perhaps dangerous job. So much attention is paid to the baby to see that he doesn't get into trouble that the driving may be neglected at a critical moment.

Figure 4 shows how to make the baby safe and yet give him sufficient freedom to keep him from fretting. Fit a strong fabric strap across the back seat as shown and loop under this a shorter piece of webbing that can be attached to a suitable harness made to fit the child. Any secure form of fastening can be used to adjust the length of the loop to give the child all the freedom possible without subjecting him to the danger of falling.

Repairing a Muffler

WHEN the rear head of a muffler blows out, the common practice is to replace the whole muffler. However, it is possible to repair a break even as serious as this at little expense. Figure 5 shows the method. First cut a strip of sheet metal several inches wide and long enough to fit around the muffler with ends bent at right angles as indicated. With the tin shears cut a number of narrow V-shaped slots, about one inch deep, along one edge. Fit over the end of the muffler with these edges protruding and bend over as shown. A couple of bolts tightened in holes drilled in the bent-up ends will draw the band tightly around the muffler and hold it together.

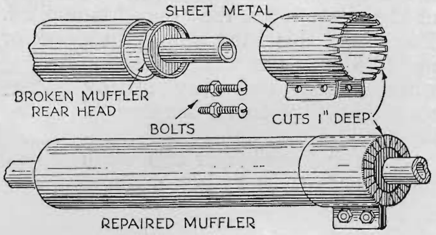


Fig. 5. A blown-out muffler rear head can be repaired with sheet metal cut and fitted as shown

A Handy Jack

A SIMPLE, quick-acting jack that has many uses around the garage is shown in Fig. 6. The uprights and lever can be made of wooden two-by-fours with one-half- or five-eighths-inch stove bolts for hinge pins. When the release wire is pulled back, the strap iron foot swings back and up so that the business end of the lever can be placed under the axle. When the wire is released and the other end of the lever depressed, the axle is raised and the foot automatically swings into place to keep the load in the elevated position. Pressure on the lever, while the release wire is being pulled, allows the axle to be lowered.

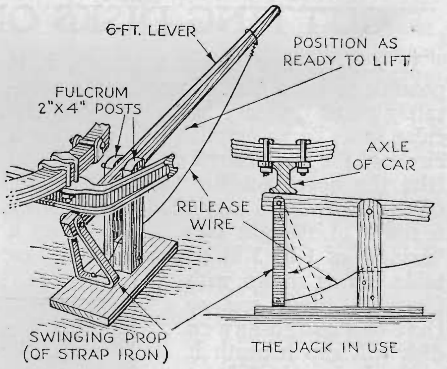


Fig. 6. A homemade jack with strap iron foot and wooden lever finds many uses in garage

HOW TO MAKE AN

Emergency Condenser

• *Timely Hints for Car Owners* •

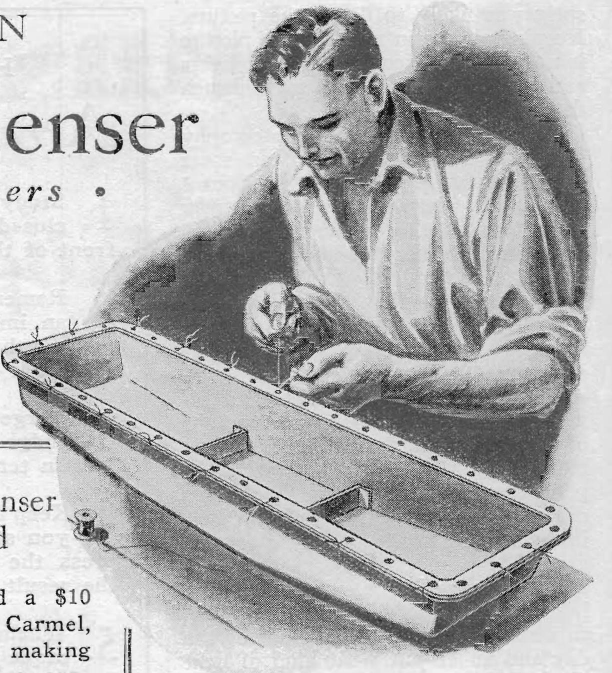


Fig. 2. To keep the gasket in place while replacing oil pan, tie it at several points with fine silk thread. It is not necessary to remove this thread after the pan is bolted in place

LAYERS of tin foil spaced by specially prepared paper constitute the condenser connected across the breaker points of the automobile ignition system. Assuming that the condenser goes bad when you are far from a service station, it is possible to work out a last resort emergency repair as shown in Fig. 1. Remove the tail-light wire, the number plates, and your shoe strings. Place the number plates with a single layer of your handkerchief between, making sure that the handkerchief cloth extends at all edges. Tie the plates together with a couple of pieces of board, if available, and connect as shown.

Tube for Radiator

A NOVEL form of radiator connection is shown in Fig. 3. Instead of a continuous piece of rubber hose between the outlet on the cylinder head and the upper radiator connection, a tube of pyrex glass is used as indicated. The ends of the glass tube should be flared sufficiently to prevent slipping. The glass tube serves as water gage and also eliminates trouble with poor circulation caused by rotting hose. The idea should be especially valuable on cars used only locally for short trips in winter, a service that permits the use of kerosene for antifreeze.

To Hold the Gasket

THERE are several ways to keep the gasket in place while refitting the oil pan. One standard way, for example, is to use studs. Figure 2 shows a simple method that calls for no special apparatus. Place the gasket on the oil pan and tie it in place at several points with fine silk thread so that the holes will be properly lined up. Bolt the oil pan to the crank case in the usual way. It will not be necessary to remove the thread, as it will not interfere with passing the bolts through the holes, nor will it cause leaks.

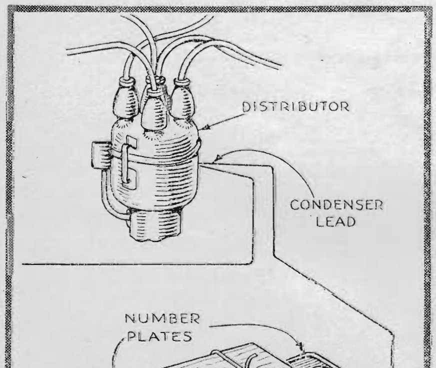


Fig. 1. License plates tied with handkerchief between serve as emergency condenser

Emergency Condenser Wins a Reward

This month we award a $10 prize to O. N. Giem, Carmel, Calif., for his plan for making a temporary repair of a condenser (see Fig. 1). Contributions are requested from auto mechanics, and if printed will be paid for at usual rates.

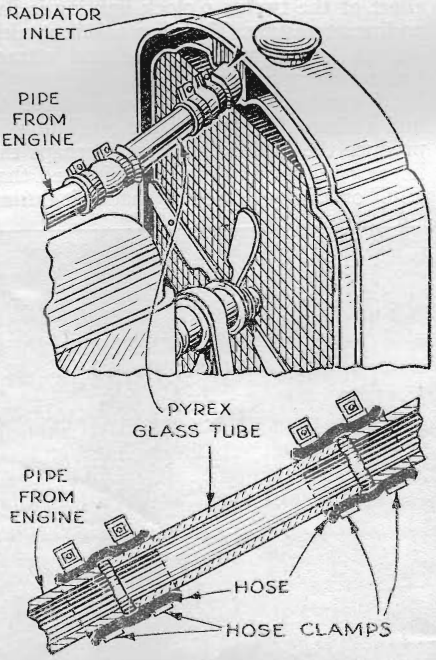


Fig. 3. A glass tube, flared to prevent slipping, can be used to form novel radiator connection

New Valve Stem

WHEN a tire tube valve stem is accidently broken or badly bent, it is necessary to replace it with a new one. This is difficult, as the hole in the tube into which the stem is clamped is small and the rubber at that point is usually reënforced. A solution is to cut a slit in the tube opposite the valve hole and replace through this hole. A patch over the slit completes the operation (see Fig. 4).

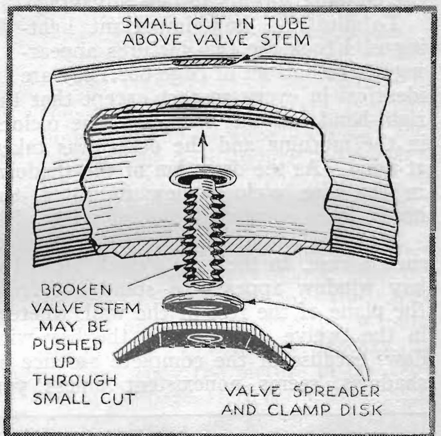

SMALL CUT IN TUBE ABOVE VALVE STEM
BROKEN VALVE STEM MAY BE PUSHED UP THROUGH SMALL CUT
VALVE SPREADER AND CLAMP DISK

Fig. 4. To put in a new tire tube valve stem, cut a slit in tube and insert stem through it

A Cleaning Spray

A SIMPLE way to make the pressure in the water mains operate an engine cleaning spray is shown in Fig. 5. First fill a tank with kerosene. Then turn on the water. The water, being heavier, forms a rising layer under the kerosene.

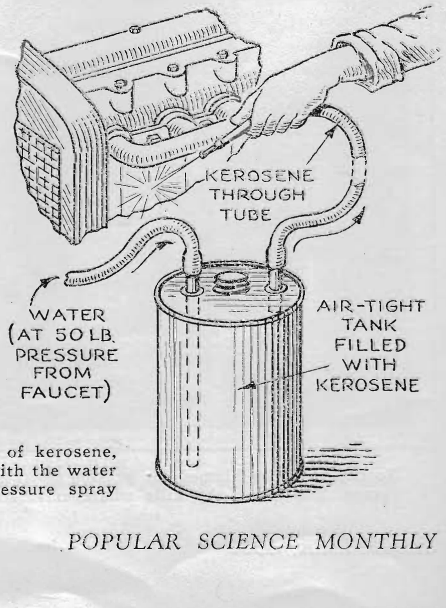
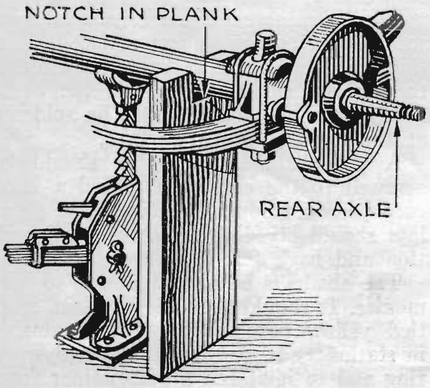

KEROSENE THROUGH TUBE
WATER (AT 50 LB. PRESSURE FROM FAUCET)
AIR-TIGHT TANK FILLED WITH KEROSENE

Fig. 5. Can of kerosene, connected with the water main, is pressure spray

Timely Hints *for* Car Mechanics

Locking Brace for Brake Pedal

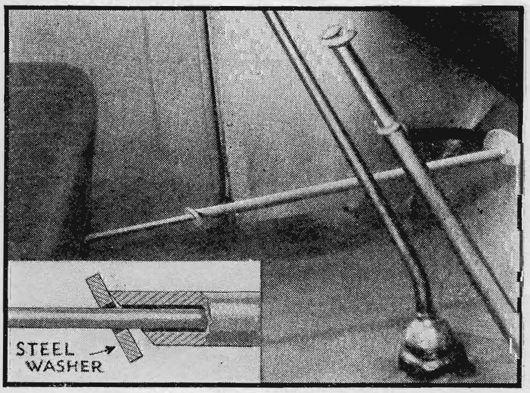
WHEN one wheel has been removed for repairs, a car can't slip off the jack if the simple auxiliary support illustrated below is placed beneath the axle. This support consists of a length of heavy plank or two by four notched at its upper end to receive the axle. The length of the support is determined by the distance from the ground to the axle when the wheel runs free.



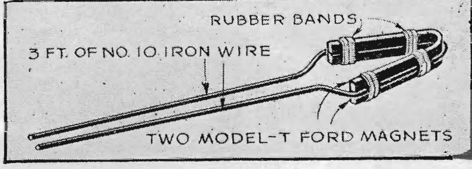
A heavy piece of plank with a notch cut in the end makes a safety support when wheel is off

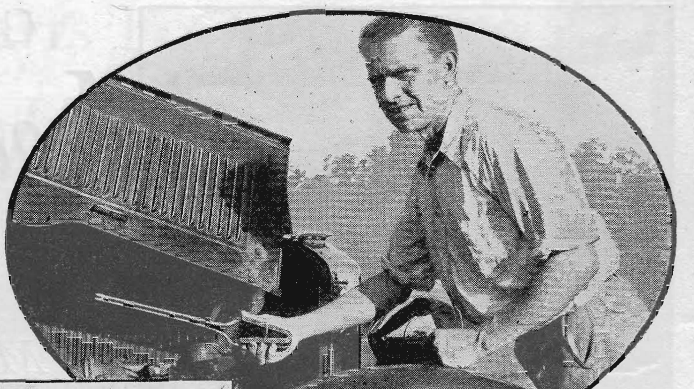
Brake Pedal Brace

AN ADJUSTABLE, self-locking brace made from a piece of one-half-inch-diameter steel rod, a length of seven-eighths-inch diameter steel pipe, and a hardened washer makes it a simple matter to hold the brake pedal in any desired position while adjustments are made to the brake rods or drums. A fourteen-inch rod and a twelve inch long pipe have been found suitable for the average car. In use, the brake pedal is pushed down and the square end of the pipe rested against the top of the pedal. The steel rod is then pulled out until its upper end rests against the base of the driver's seat and the washer is pressed against the angle at the end of the pipe.



Self-locking brace to hold brake pedal during adjustment is made of steel rod, pipe, and washer

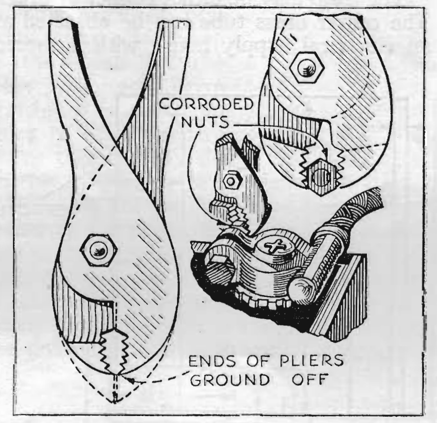




Two old magnets from a Ford fitted with extensions, as shown at left, can be used to pick up small parts dropped into inaccessible places around the motor as illustrated above

Using Old Magnets

TWO discarded Ford magnets, supplied with wire pole extensions in the manner illustrated, form a valuable tool for retrieving small parts that drop into hard-to-get-at places around a motor. The magnetized extensions can be slipped into small openings without difficulty. A better job can be had by binding the extensions to the magnets with copper wire and by supplying an iron keeper to be placed across extensions when the magnet is not in use.



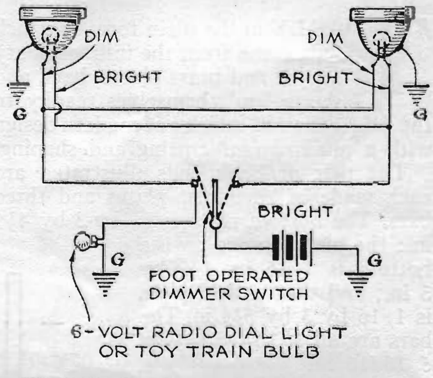
Grinding the ends of plier jaws to sharp curve permits use on corroded cable clamp

Better Pliers

PLIERS used to adjust storage battery cable clamps that have become corroded can be greatly improved by grinding the ends of the jaws to a sharp curve as shown above. Altered in this manner, they can be forced down over the nuts with little difficulty and the teeth will get a good grip.

A Dimmer Guide

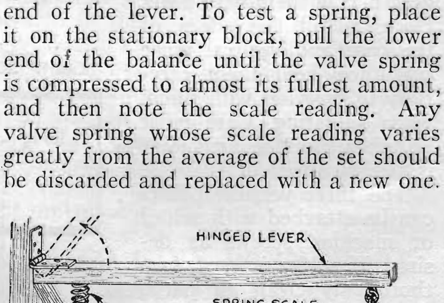
WHEN driving an automobile equipped with a foot-operated dimmer switch, it is often difficult, especially when a car is approaching you, to determine whether the headlights are bright or dim. A good plan is to place a small flashlight bulb of the five-cell type under the dashboard and connect it from the dimmer side of the circuit to the ground. When the switch is on the dimmer side, the lighted flashlight bulb will tell the driver at a glance that his headlights are dimmed and not blinding approaching drivers.


DIM
DIM
BRIGHT
BRIGHT
G
G
G
G
BRIGHT
FOOT OPERATED DIMMER SWITCH
6-VOLT RADIO DIAL LIGHT OR TOY TRAIN BULB

Tiny bulb placed under the dashboard can be connected to show if lights are dim or bright

Testing Valve Springs

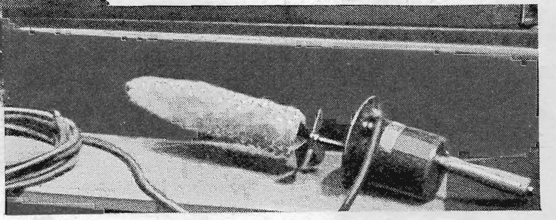
RELATIVE strength of valve springs can be determined by means of a simple compressing lever and a small spring balance. The lever is hinged to a wall above a stationary block. A small spring balance is attached to the outer end of the lever. To test a spring, place it on the stationary block, pull the lower end of the balance until the valve spring is compressed to almost its fullest amount, and then note the scale reading. Any valve spring whose scale reading varies greatly from the average of the set should be discarded and replaced with a new one.



Relative strength of valve springs can be ascertained with lever and balance as shown

SHORT CUTS *for* Auto Jobs

Homemade Brush and Blower Clean Motor Quickly . . . Sliding Windows Can Be Put in Open Car Curtains



ODD CLEANING TOOL IS EASILY MADE

Blower and brush, below, made of scrap parts, are driven by a horn motor and used, as shown at left, to clean around spark plugs and wiring on the engine

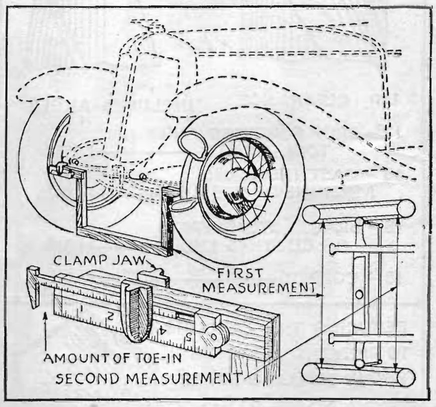


Fig. 3. By clamping a slide caliper to end of a U-shaped wooden frame, you have a gage that can be used to test the toe-in of front wheels

MADE from scrap parts, the motor-driven brush, with blower, shown above is an inexpensive timesaver for cleaning an automobile engine. The blades from a discarded electric fan of the midget type are mounted on the wire shank of a spoke brush from which the wooden handle has been removed. By means of a loop, a right-angle bend, and some solder, the end of the wire shank is then attached to the threaded end of the armature of a motor from on old horn. The handle taken from the spoke brush forms a convenient grip when attached to the rear of the horn motor housing. It is connected to the car battery by means of a suitable length of lamp cord.

Windows for Open Car

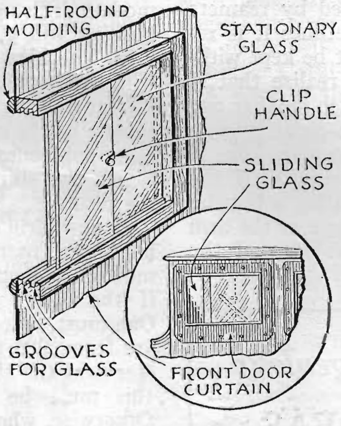


Fig. 1. Wooden frame set in curtains of open car can be fitted with glass windows that will open by sliding

RIGID sliding glass windows can be easily installed in the side curtains of an open car. The wood frame, shown in Fig. 1 consists of four pieces, each having two 3/16-in. grooves to receive the two glass panels. The top and bottom pieces and one end of the frame should be fastened in place first, the stationary and movable windows slid in, and then the remaining side attached. The front glass can be held in place with cement.

Drive Shaft Tube

WHEN assembling the rear end of a car after repairs have been made, it is usually quite difficult to lift the drive shaft tube and at the same time guide the end of the shaft into place. However, if a long plank is placed over the rear axle and under the shaft tube in the manner indicated in Fig. 2, the long overhanging portion of the plank will counterbalance the shaft and leave the hands free to do the guiding.

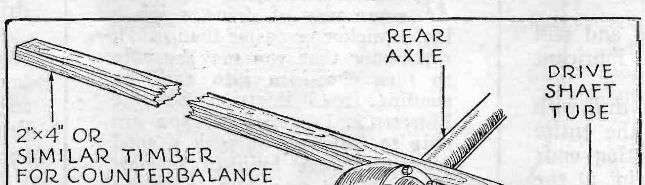


Fig. 2. A long plank is placed over the rear axle and beneath the drive shaft tube, to raise tube so the drive shaft can be guided home

Measure the Toe-in

BY CLAMPING a small, slide caliper rule to one end of a U-shaped wooden frame similar to that illustrated in Fig. 3, you can make a useful gage for testing the toe-in or "gather" of the front wheels on your car. The short horizontal members of the wooden frame should be located so that they are in the horizontal plane of the front axle when the gage is in place. To use the gage, place the frame between the rims at the front of the wheels and clamp the caliper in place in such a way that the head touches the rim when the slide is closed. Next, move the assembled gage to a corresponding position at the back of the wheels and open the caliper until the head touches the rim. The reading will be an accurate measure of the toe-in. The proper value for your particular car can be obtained from the general instruction booklet issued by the manufacturer.

Twin Guide Mirrors

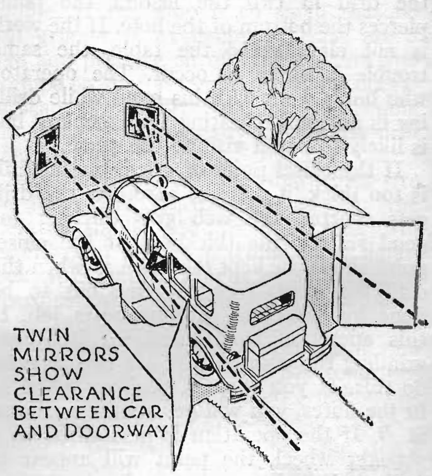
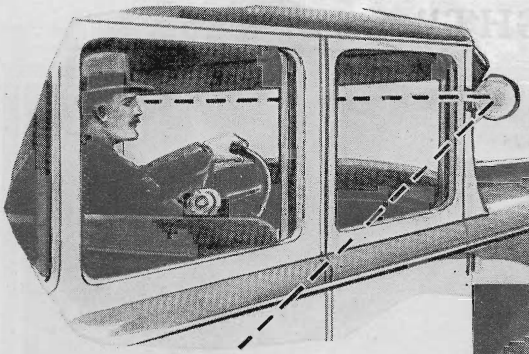

TWIN MIRRORS SHOW CLEARANCE BETWEEN CAR AND DOORWAY

Fig. 4. Two mirrors, placed near the side walls of a small garage, guide driver in backing out

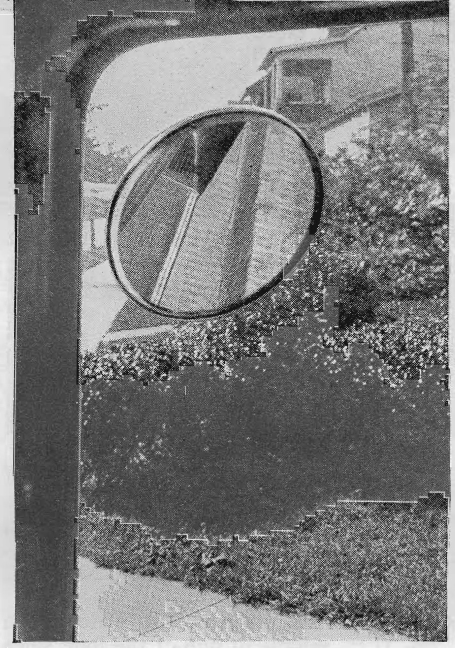
TWIN mirrors fastened to the rear wall of a one-car garage will aid the driver when he backs the car through the narrow doorway. The mirrors, placed about ten inches from the side walls as in Fig. 4, should be adjusted so the driver can see the back fenders on each side. By looking first at one mirror and then at the other, it is a simple matter to keep the car centered in the doorway. The mirrors should be large enough to give a good view of the fenders and each side of the car. Suitable mirrors can be purchased in most five-and-ten-cent stores. Adjust each mirror by having someone hold it at various angles while you check the view from the driver's seat.

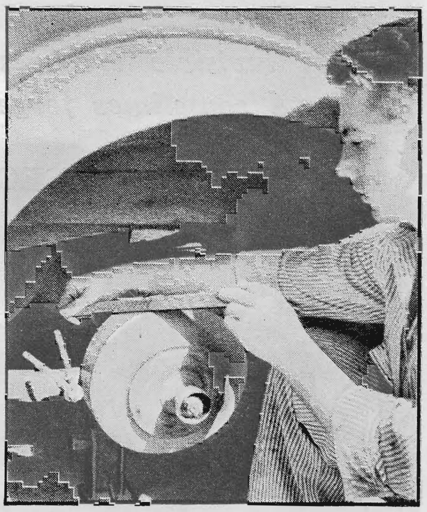
Hints Useful to Motorists

Mirror Mounted on Front Door Gives Driver Helpful Rear View in Parking

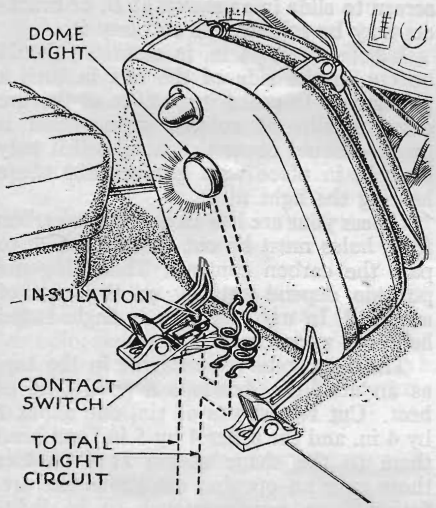


Drawing at left shows how mirror is mounted on front door hinge to show curb. Photo below gives view as seen from driver's seat





MOUNTED on the upper hinge of the right-hand front door of your car, a rear vision mirror can be so adjusted that it will show you the clearance between the running board and the curb when you are parking. Although an ordinary door-hinge mirror of the plate glass type is shown in the photograph at the right, a much wider view can be obtained if a curved, broad-vision mirror is used. A mirror adjusted this way will also aid the driver in traffic.

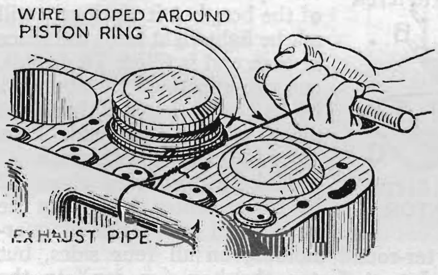


Floor Light for Car

TIPPING up the movable front seat on a two-door sedan wired according to the sketch shown above, automatically floods the floor and rear seat with light. The light, of the usual dome light type, is fitted into the underside of the seat and connected into the tail light circuit by means of two contacts, one on the seat and one on the floor. These are so arranged that they touch only when the seat is fully raised. Being connected into the lighting circuit, the device does not operate during the day when the other lights are not being used.

Fitting Piston Rings

AMATEUR mechanics, who have no special tools, can spring new piston rings into place by means of a loop of strong wire. The wire is anchored at one end to an exhaust pipe and then looped around the ring to be compressed. A suitable wooden handle, fastened to the other end of the wire, provides a convenient grip for pulling the wire. The tightened loop compresses the ring so it will slide easily into the cylinder. By pushing the piston down, the loop can be placed over the next ring and the process repeated.

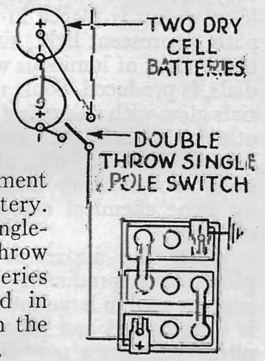

WIRE LOOPED AROUND PISTON RING
EXHAUST PIPE

Wire fastened to exhaust pipe and then looped around piston ring compresses it to fit cylinder

Filing Your Brakes

EXTERNAL brakes that have become scored and grooved through long use often can be put back into first class shape with a coarse file. Jack up one wheel and remove the brake bands. Then, with the gear shift lever in high and the motor running a trifle faster than ordinary idling speed, apply the file (a twelve-inch fender file preferred) to the spinning drum in the manner shown in picture above. Sandpaper and steel wool can be used for the finishing touches.

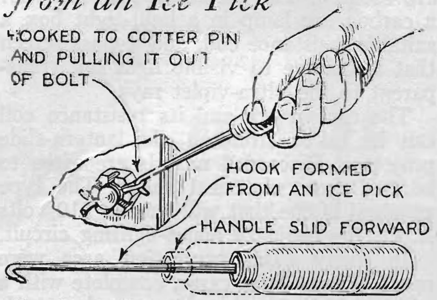
For Quick Starting



QUICKER starting in cold weather can be obtained if two dry batteries connected in series are used to supplement the storage battery. By means of a single-pole, double-throw switch the batteries can be connected in and cut out when the motor turns over.

Making a Cotter Pin Puller from an Ice Pick

ALTERING an ice pick of the sliding-handle variety, converts it into an efficient cotter pin puller. First, cut off about one inch of the pick and grind it to a blunt point. Then anneal the tip by heating it to a cherry red, bend the hook, and harden it by reheating and dipping it in water. In use, the hook is placed in the eye of the cotter pin, the handle slid forward and then jerked back. When removing heavy cotter pins it may be necessary slightly to open the split ends so that they can be pulled out.


HOOKED TO COTTER PIN AND PULLING IT OUT OF BOLT
HOOK FORMED FROM AN ICE PICK
HANDLE SLID FORWARD

Heating and bending the point of an ice pick, converts it into handy tool to pull cotter pins